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IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF OKLAHOMA

W. A. DREW EDMONDSON, in his)
capacity as ATTORNEY GENERAL)
OF THE STATE OF OKLAHOMA and)
OKLAHOMA SECRETARY OF THE)
ENVIRONMENT C. MILES TOLBERT,)
in his capacity as the)
TRUSTEE FOR NATURAL RESOURCES)
FOR THE STATE OF OKLAHOMA,)

Plaintiff,)

vs.)

TYSON FOODS, INC., et al,)

Defendants.)

4:05-CV-00329-TCK-SAJ

VOLUME I OF THE VIDEOTAPED

DEPOSITION OF BILLY CLAY, PhD, produced as a
witness on behalf of the Plaintiff in the above
styled and numbered cause, taken on the 24th day of
March, 2009, in the City of Tulsa, County of Tulsa,
State of Oklahoma, before me, Lisa A. Steinmeyer, a
Certified Shorthand Reporter, duly certified under
and by virtue of the laws of the State of Oklahoma.

TULSA

REPORTERS

EXHIBIT

B.1

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1 anybody has located such a place in the Illinois
2 River watershed where land-applied poultry waste
3 will not run off?

4 MS. LONGWELL: Object to form.

5 A Well, I will attempt to answer that question
6 again, and I think I've already answered it three or
7 four times. I, first of all, have not found anybody
8 that verifies that poultry litter applied is in the
9 water, therefore, saying that it has run off, and so

10:37AM

10 I can't find a place that doesn't do it because
11 there's not a place that does do it.

10:38AM

12 Q Let me hand you what's been marked as Exhibit
13 7, sir, and ask you, you've seen this document, have
14 you not?

15 A Yes, sir.

10:38AM

16 Q Tell the court what this document is.

17 A This is a document labeled Agricultural Waste
18 Management Field Handbook, Chapter 4, which
19 specifically talks about agricultural waste
20 characteristics. It is produced by the USDA and
21 originally the entity was the Soil Conservation
22 Service.

10:39AM

23 Q Based upon this document, sir -- let me ask
24 you this: Did you use or rely on this document for
25 purposes of forming any of your opinions in this

10:39AM

1 in order to formulate this 1.3 unit?

2 A His name is Raleigh Jobes.

3 Q Is he still with Oklahoma State University?

4 A He's emeritus.

5 Q Did he do the calculations for you? 11:00AM

6 A Yes.

7 Q Looking again at Exhibit 7 and the

8 characteristics of the beef weight as excreted and

9 the poultry waste as excreted in Tables 4-8 and

10 4-14, would you agree with me that the poultry 11:00AM

11 waste, as excreted for total solids, exceeds that of

12 beef weight -- waste characteristics as excreted?

13 A Excuse me, sir. Give me the pinpoint again.

14 4-8 --

15 Q Table 4-8 and Table 4-14. 11:01AM

16 A And do you have the Bates number there?

17 Q 150 and 146.

18 A 146, and the question then is --

19 Q What's the general -- well, the total solids

20 listed there are anywhere from 11.6 to 13; do you 11:01AM

21 agree?

22 A On beef cattle, yes, sir.

23 Q Yes, sir, and if you compare that to the

24 poultry waste characterization as excreted on Page

25 150, you'll find the total solids there are all 25 11:01AM

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1 as opposed to the 11.6 to 13; would you agree?

2 A Excuse me. Yes, I do.

3 Q All right. So generally the poultry waste
4 solids, as excreted, are two times that of beef;
5 would you agree with that?

11:01AM

6 A Yes.

7 MR. TUCKER: I want to interpose an
8 objection here because we had this discussion
9 earlier, and you directed that I read the definition
10 in your document at Exhibit 7, and I've done that,
11 and the definition of waste which you used in your
12 questions about total solids at Page 138 of your
13 exhibit is defined at Page 140, and the definition
14 of waste at Page 140 is limited to that chapter,
15 which is Chapter 4.1 or Chapter 4. Chapter 4, waste
16 material as defined from the total solids
17 computation, according to the definition in your
18 document, includes bedding material. Of course,
19 there isn't bedding material with the cattle manure.
20 So then when you flip over to the question you just
21 asked the witness, I think you are talking about
22 apples and oranges, and I'm sorry you directed me to
23 look at your definition, but I did, and the book
24 uses the definition in two different ways, and the
25 way you used it, you've mixed the two definitions,

11:02AM

11:02AM

11:02AM

11:02AM

1 which gives you a misleading answer. So I object to
2 the whole line of questions based on Exhibit 7.

3 MR. GARREN: If you read further, you'll
4 find we're not comparing apples and oranges. We're
5 comparing waste as excreted. Waste as excreted
6 normally does not include bedding material.

11:03AM

7 Q And, Dr. Clay, do you understand that to mean
8 when we talk about waste, as excreted, to exclude
9 bedding material?

10 A I do.

11:03AM

11 Q All right.

12 MR. TUCKER: But you're not -- you're
13 missing my point. It is that the total solids is
14 defined differently at Page 138 as -- other than as
15 it is discussed at Page 146. You can't have it both
16 ways.

11:03AM

17 MR. GARREN: Counselor, I'm sorry that
18 you're confused.

19 Q Dr. Clay, do you have any confusion about what
20 we're talking about as an excreted manure from a
21 beef cattle and from poultry as described in these
22 tables that we've just compared for total solids?

11:03AM

23 A I believe I understand that your question was
24 total solids, and these comparative -- in one case a
25 class of animals and another a group of animals.

11:03AM

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1 You were asking me essentially what is the dry
2 weight of the excreted manure, which is the -- which
3 is the total solids in this case, and it was 13
4 compared to 25.

5 Q And you understand that we're not talking 11:04AM
6 about poultry litter or bedding material when we're
7 talking about excreted waste, are we?

8 A That's the way I understood it.

9 Q Okay. For purposes of your making opinions in
10 this case, you've not conducted any field study or 11:04AM
11 independent analysis of the characteristics of
12 waste; is that true?

13 A In the Illinois River watershed?

14 Q No. For any animals that you're opining on
15 with regard to your report. 11:04AM

16 A No, not in this case, I have not.

17 Q So it's fair to say you've relied on certain
18 resources that you chose to use in order to make
19 those comparisons; true?

20 MR. GRAVES: Object to the form. 11:05AM

21 A Well, you gave me one of those and said is
22 this, and I said yes, it's one of them.

23 Q It's one of them, but that's my point. You've
24 not done anything independently; you're relying on
25 resources for the information that you're using to 11:05AM

1 compare characteristics of waste when giving an
2 opinion in this case?

3 A And knowledge and experience, as well as that
4 of Dr. Raleigh Jobes.

5 Q Okay, and your knowledge and experience is not 11:05AM
6 based upon any independent analysis of either beef
7 or poultry waste, as excreted, characteristics, is
8 it?

9 A No. My knowledge and experience is I've been
10 involved in studies in which we were measuring dry 11:05AM
11 weight.

12 Q Okay. Other than dry weight, have you been
13 involved in any other studies with regard to the
14 characteristics of beef or poultry manure as
15 excreted? 11:06AM

16 A Yes. Well, yes, more than dry weight. There
17 have been instances where we're interested in the
18 total nutrients, particularly the major nutrients.

19 Q And did you in fact conduct the study yourself
20 to evaluate the total nutrients in waste? 11:06AM

21 A Participated in.

22 Q Okay, and was that paper published and peer
23 reviewed?

24 A It wasn't for the purpose of the paper. It
25 was for the purpose of approval of a pharmaceutical 11:06AM

1 or pharmaceuticals actually.

2 Q Okay, and it was not published; correct?

3 A Not published in the domain that I believe

4 you're asking me, which is the peer-reviewed domain,

5 no. It was reviewed by some very critical people,

11:06AM

6 that is, the reviewers of the Food & Drug

7 Administration.

8 Q And you were paid by a pharmaceutical company

9 to conduct the analysis?

10 A Correct.

11:06AM

11 Q All right. Would you agree with me that the

12 most dominant poultry type grown in the IRW is a

13 broiler?

14 A Yes, I would.

15 Q Would you agree that the next largest quantity

11:07AM

16 of bird type grown in the IRW would be the layer?

17 A Probably so.

18 Q Are you aware, sir, that the Illinois River

19 watershed has been declared a nutrient surplus area?

20 A Well, I know the State of Oklahoma calls their

11:07AM

21 portion of it a nutrient limited watershed, and I

22 know that on the Arkansas side they have labeled

23 some counties, which include the counties within the

24 Illinois River watershed, as nutrient surplus.

25 Q Okay, and are those counties where the

11:07AM

1 A I'm trying to recall whether it was past 3.5
2 or not. I can't remember. Seems to me it was
3 closer to 3.

4 Q You would agree, sir, that in making your
5 report and opinions contained in that report, you
6 did not use the actual poultry production numbers
7 that are provided by the integrators?

11:58AM

8 A Let me make sure I understand your question.
9 I think you asked me did I use the production
10 numbers provided by the integrators, and the answer
11 was that I used this in a comparative basis because
12 I made estimates, as well as other people who have
13 made estimates, and I used it as part of the
14 comparator.

11:58AM

15 Q The primarily -- the primary tool that you
16 relied on in establishing poultry production numbers
17 was the 2002 Ag Census, was it not?

11:59AM

18 A Yes, that's correct.

19 Q Do you agree that that Ag Census does not
20 provide bird production by integrators?

11:59AM

21 A Yes, I do.

22 Q And do you agree that it provides the census
23 information by either a state level, county level or
24 a ZIP Code?

25 A Yes.

11:59AM

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1 Q It does not provide census information based
2 upon watersheds, does it?

3 A No.

4 Q Do you agree that -- it was necessary -- well,
5 let me ask you this way: Who made the assumptions
6 and calculations for the bird numbers; was that Mr.
7 Jobes or was that you?

11:59AM

8 A Mr. Jobes made the calculations and I made the
9 assumptions.

10 Q Okay. Had you ever performed the task of
11 calculating bird production in the manner that you
12 did it in this case before?

12:00PM

13 A Not exactly in this manner, no.

14 Q Okay. Tell me what other manner you've
15 employed in calculating bird production numbers.

12:00PM

16 A Just -- just using census data and tabulating.

17 Q And what -- was there a confined area -- a
18 defined area that you were requested to make those
19 calculations for?

20 A Well, the Illinois River watershed, this case.

12:00PM

21 Q I'm sorry. I misspoke then. I misunderstood
22 what you said. Let me ask it this way: Have you,
23 other than in this case, prepared calculations on
24 the production of poultry for any other location
25 than the IRW?

12:00PM

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1 A Yes.

2 Q Okay. What area did you do it for?

3 A And those were cursory calculations for

4 Eucha-Spavinaw watershed and not specifically --

5 there was a portion of the Illinois River watershed

12:01PM

6 where I was doing a little excerpt work in and

7 around Prairie Grove.

8 Q Okay. You were an expert in the Prairie Grove

9 case, is that correct, with the integrator

10 defendants?

12:01PM

11 A That's correct.

12 Q All right. So you made some calculations on

13 poultry production in that area?

14 A I looked at them, as I said, cursory. I was

15 just interested in cursory numbers.

12:01PM

16 Q All right. So you didn't do the detailed work

17 that's exhibited in your report?

18 A No.

19 Q All right, and in the Eucha-Spavinaw area,

20 what was the purpose of your calculation of bird

12:01PM

21 production numbers there?

22 A Again, I was looking at what the census data

23 provided compared to what was being estimated by

24 various sources.

25 Q And what was the purpose for your doing that?

12:01PM

1 A To see if there's -- the ballpark figures were
2 similar.

3 Q Did you rely on the ZIP Code method in making
4 the calculations in the Eucha-Spavinaw calculation?

5 A No. Land area method. 12:02PM

6 Q Did you use the ZIP Code method in the portion
7 of the IRW for Prairie Grove when you did that work?

8 A No.

9 Q What did you use there?

10 A Again, just location. 12:02PM

11 Q I don't understand location. What do you
12 mean?

13 A I was interested in -- most of the information
14 was not from the census in that case. Most of it
15 was from direct observation and gathering of
16 information in that fashion. 12:02PM

17 Q And did you -- were you the one responsible
18 for acquiring the direct information?

19 A The limited amount that was necessary, yes.

20 Q And how limited was it? 12:02PM

21 A It was just to verify that there are a given
22 number of poultry houses within a radius of Prairie
23 Grove.

24 Q And how did you go about determining that?

25 A On the ground. 12:03PM

1 Q Let me rephrase it then.

2 A Okay.

3 Q Are there any other integrators besides the
4 defendants in this case raising poultry in this
5 watershed?

12:04PM

6 A I don't know of any.

7 Q Did you make any inquiry to determine if there
8 was?

9 A I did, but that was cursory also.

10 Q How did you go about doing that inquiry?

12:04PM

11 A I don't remember who it was I was asking, but
12 I think I was asking some people at Oklahoma State
13 University that Raleigh Jobes knew, an economist who
14 had spent some time looking at production in the
15 watershed.

12:04PM

16 Q Tell the court why you didn't use the actual
17 poultry production numbers prepared by the
18 defendants for your work in this case.

19 A Because I was using the census data of the
20 year 2002 for all other information, and as we
21 viewed it, it was only appropriate to use the same
22 census data for the poultry numbers as well.

12:05PM

23 Q Do you know that the information, in looking
24 at the interrogatory responses of the defendants,
25 provided 2002 data?

12:05PM

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1 University of Arkansas. This was some time ago.

2 Q Not as part of this case?

3 A Well, I can't remember to be frank with you,
4 but it was quite a while ago when we did that, and I
5 asked him at that time what he thought the
6 percentage of poultry growers that also have cattle
7 were, and he said he thought about half.

02:05PM

8 Q Okay, and are there more cattle growers than
9 poultry producers in the IRW, if you know?

10 A Yeah. There are about 3,400 cattle producers
11 and about 600 poultry producers.

02:05PM

12 Q And is that the entire IRW or just the
13 Arkansas side you're talking to?

14 A Entire IRW.

15 Q All right, and you got that information from
16 what source?

02:05PM

17 A That's from the 2002 census data.

18 Q Did you do anything to quantify the amount of
19 poultry growers who do not have sufficient acreage
20 for spreading poultry waste?

02:06PM

21 A I did not.

22 Q Did you do anything to survey and quantify the
23 amount of landowners who you claim can accept
24 poultry litter that are willing to accept poultry
25 litter on their lands; did you do a poll to -- did

02:06PM

1 holding capacity to the soil, will also aid in the
2 survival of bacteria?

3 A That's not the point here. The point is
4 organic matter, even if it's dry, absolutely dry,
5 has the intrinsic value of aiding in water holding
6 capacity if there is moisture that comes to be, and
7 so to answer your question relative to making the
8 bacteria survive, the answer is no.

02:16PM

9 Q Would you agree with me, sir, though, that
10 because it can hold water, that intrinsic value you
11 talk about, this organic matter, because it does
12 hold water, it creates a medium that allows bacteria
13 to survive?

02:16PM

14 MS. LONGWELL: Object to form.

15 A It could allow bacteria to survive if they
16 don't have any exposure to the sunlight.

02:17PM

17 Q I believe you make a statement in your report
18 that poultry farms are in higher concentration on
19 the Arkansas side of the watershed. Do you agree
20 with that? I mean, that's your statement.

02:17PM

21 A Yes.

22 Q And you did that based upon counting farms; is
23 that how I understand it?

24 A I did that based on the reporting from the
25 2002 census. I could have counted farms because I

02:17PM

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1 had a map that showed them, but that wasn't what I
2 relied upon.

3 Q Okay. So you relied again on the 2002 census
4 to count the number of farms that you report there,
5 463 versus 140?

02:17PM

6 A Correct.

7 Q Okay. Would you agree, based upon the number
8 of farms, a higher number of farms concentrated on
9 the Arkansas side, there is, likewise, a higher
10 number of poultry being produced per acre on the
11 Arkansas side?

02:18PM

12 A One would assume that with the higher number
13 of producers, and that's what the data shows, 2002
14 census, that there's more poultry produced on the
15 Arkansas side than there is in the Oklahoma side.

02:18PM

16 Q And resulting from that would be greater
17 poultry waste is produced on the Arkansas side than
18 the Oklahoma side; correct?

19 A That would be correct, and in your case waste
20 means litter in my case.

02:18PM

21 Q Your Opinion No. 1 says that poultry litter,
22 like other livestock manures and associated
23 beddings, has a long history of safe usage as an
24 important source of fertilizer for human food
25 production. I notice conspicuously that you don't

02:19PM

1 poultry litter after you put on a layer or two, and
2 you will actually have some fermentation going on
3 there.

4 Q And you're talking about fermentation on the
5 floor of the house or in a pile that's been stored?

04:52PM

6 A Both.

7 Q And what have you done to clinically establish
8 fermentation in poultry litter sitting in the barn
9 floor?

10 A I haven't.

04:52PM

11 Q And what -- I don't see any studies in your
12 materials and that doesn't mean they're not there,
13 but can you point me to any study that uses the term
14 fermentation?

15 A No, not that uses the term fermentation, but
16 that's a term I picked up from a personal
17 communication with a researcher at the University of
18 Georgia, and she was telling me about the analysis
19 of bacteria in poultry litter versus fresh droppings
20 and pointed out to me that as the poultry litter

04:53PM

21 accumulates in the house, you actually have heating
22 that goes on, and part of that heating is what
23 raises the temperature within the poultry house;
24 therefore, you have to control the environment, and
25 that's part of the drying process as well, and

04:53PM

1 during that process, there is loss of bacteria
2 drying off as if it's composting. So composting is
3 a better term.

4 Q Well, did you use the term fermentation
5 because it in fact isn't true composting when it's
6 only four or five inches deep in a poultry barn?

04:53PM

7 A It is not composting from a point of view of a
8 stack where you get the temperatures to extremely
9 high levels, but you do have elevated temperatures,
10 and you do have because of the drying -- the
11 necessary drying effect in the barn, you have a loss
12 of bacteria.

04:54PM

13 Q Isn't it -- and I think you admit this in your
14 report -- the goal of a farmer to keep the barn
15 moisture at anywhere from 30 to 40 percent?

04:54PM

16 A Lower than that. Their target is 20.

17 Q And how do you know that?

18 A From talking to many of them about that.
19 Target is 20, but they -- they'll get to 25, 24, 28.
20 Some of them get 35. They don't like that; that's
21 not good.

04:54PM

22 Q Did the term fermentation -- was that your
23 term or did you learn it from this University of
24 Georgia researcher?

25 A I -- it's probably my term. I think

04:54PM

1 composting would have been a better choice.

2 Q And who is the researcher that you spoke to at
3 the University of Georgia?

4 A Well, let me give you the records. I'm trying
5 to remember her name. She's in the article. The
6 principal author is Lu, L-U, and she has been
7 involved in that and has been involved in that
8 research for a long time.

04:55PM

9 Q Okay. Is she cited on Lu's article?

10 A Yes.

04:55PM

11 Q Okay. We'll get to it. Can you point me to
12 any place in any agricultural waste management
13 handbook that supports your statement that manure is
14 allowed to undergo fermentation while in the barn?

15 A Well, the -- if you -- if you just used the
16 guidelines of the bacteria that exist and changes
17 that exist in Chapter 4 and then there will be a
18 reduction in everything in the barn.

04:56PM

19 Q What do you mean a reduction in everything?

20 A Well, dry weight will change because you have
21 a loss of nitrogen and carbon dioxide. That's part
22 of the process of composting, and you will also have
23 a reduction in the bacteria.

04:56PM

24 Q And that all is occurring in the house while
25 the birds are in the house; correct?

04:56PM

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1 A No.

2 Q So at the time that it's reported, it may very
3 well be that the next day or next week or next month
4 it then is applied, but it would be in the same
5 year; would you agree with that?

05:38PM

6 A It could be.

7 Q Okay.

8 A But the point, sir, in this is that I didn't
9 subtract carryover, nor did I subtract stored from
10 anything. The only thing I subtracted is -- to look
11 at is the known exported.

05:38PM

12 Q Okay, and let's talk about that. You used
13 2002 production for the amount of waste that's being
14 produced; correct?

15 A That was the reference I had available to me.

05:39PM

16 Q Okay, all right. Well, we'll talk about that
17 later, but why would you deduct the amount that's
18 being hauled out in 2007 when it was never hauled
19 out in 2002?

20 A Well, it was beginning to be hauled out before
21 2007.

05:39PM

22 Q Well, did you take a look to see how much was
23 produced in 2002 to compare how much was produced in
24 2007?

25 A No.

05:39PM